

## **The Multi-Cell SC CH-Cavity**

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The CH cavity is a multi-gap drift tube structure operated in H210 mode currently under development in a collaboration between IAP Frankfurt and GSI. Like the IH cavity (H110 mode) used at different places now for the acceleration of ions, this structure provides a high shunt impedance and allows the acceleration of intense beams at high accelerating gradients.

The dedicated KONUS beam dynamics used for H-mode cavities results in long lens free sections (like the High Current Injector at GSI), making the design of a superconducting CH resonator possible. An other aspect of the investigations started at GSI and IAP Frankfurt is to extend the attractive velocity range of H-mode cavities up to  $\beta=0.5$  by these actual developments.

Many future projects (the Accelerator Driven System ADS, International Fusion Material Irradiation Facility IFMIF, European Spallation Source ESS and Spallation Neutron Source SNS) are based on the availability of efficient accelerating cavities with properties like mentioned above. Other applications as envisaged within future projects are cw operation of pro-ton or ion accelerators. It is commonly accepted that above an energy of 200 MeV/u superconducting cavities are superior to room temperature structures at duty cycles above a few percent. By combining the advantages of CH-mode cavities with the benefits of superconductivity, effective ion acceleration at high duty cycle and at low injection energies will become possible. For high current proton beams the injection energy will be around 10 MeV, while for heavy ions the injection energy may become as low as 1 MeV/u.

Our investigations indicate that CH-mode cavities are well suited to design superconducting resonators. The results of the numerical simulation and the first measurements of a room temperature model cavity are very promising. Using state of the art technology the fabrication of a s.c. CH-mode cavity will be possible. A design study in close cooperation with industry will be available in one year. The cryostat, the laminar flow box and the fluid He dewars with the recovery system is already available.